

#### ABSTRACT OF THE DISCLOSURE

In a fluxgate sensor integrated in a semiconductor substrate and a method for manufacturing the same, the fluxgate sensor includes a soft magnetic core formed on the semiconductor substrate, an excitation coil winding the soft magnetic core and being insulated by first and second insulating layers deposited above and below the soft magnetic core, respectively, and a pick-up coil, winding the soft magnetic core and being insulated by third and fourth insulating layers deposited above and below the excitation coil, respectively.